

We claim:

1           1.     An electrosurgical, tissue sealing medical device, comprising in  
2 combination:

3                 co-operating device jaws including jaw portions for manipulating tissue;  
4                 solution infusion openings defined along the jaw portions, the solution infusion  
5 openings being constructed and arranged for receiving an electrically conductive  
6 solution and infusing the solution through the openings and along the jaw portions  
7 into tissue manipulated by the jaw portions; and

8                 an electrical conductor operatively associated with the device jaws for  
9 conducting electrical energy to the electrically conductive solution in contact with the  
10 manipulated tissue, the solution being supplied in quantity and the electrical energy  
11 being supplied in power such that energy density in the tissue in contact with the  
12 solution is in a range that seals the tissue against substantial flow of fluids;

13                 whereby tissue may be manipulated without desiccation of the tissue at the  
14 tissue/device interface and with sealing of the tissue against substantial fluid flow from  
15 the tissue.

1           2.     An electrosurgical, tissue sealing medical device as in claim 1, the jaw

1 portions including opposed inner faces, the solution infusion openings being a plurality  
2 of openings defined and spaced along the inner faces.

1 3. An electrosurgical, tissue sealing medical device as in claim 1, further  
2 comprising:

3 at least one groove along at least one of said jaw portions, the solution  
4 infusion openings in the at least one jaw portion having the at least one opening  
5 located adjacent the at least one groove.

1 4. An electrosurgical, tissue sealing medical device as in claim 1, further  
2 comprising:

3 at least one groove along at least one of the jaw portions, the solution infusion  
4 openings in the at least one jaw portion having the at least one groove located in the  
5 at least one groove.

1 5. An electrosurgical, tissue sealing medical device as in claim 1, further  
2 comprising a plurality of grooves along the jaw portions of the co-operating device  
3 jaws, the solution infusion openings located in the plurality of grooves.

1                   6.     An electrosurgical, tissue sealing medical device as in claim 1 further  
2 comprising:  
3                   serrations on at least one of the jaw portions.

1                   7.     An electrosurgical, tissue sealing medical device as in claim 1 further  
2 comprising:  
3                   a proximal manual handle, a shaft extending from the handle to the jaws,  
4 whereby the jaws are distally located, and a mechanism connected to the handle and  
5 jaws whereby the proximal handle manipulates the distal jaws, for endoscopic use of  
6 the device.

1                   8.     An electrosurgical, tissue sealing medical device as in claim 1 further  
2 comprising:  
3                   a pivot for pivoting movement of the jaws into contact with each other and  
4 away from contact with each other.

1                   9.     An electrosurgical, tissue sealing medical device as in claim 8 further

1 comprising:  
2 a blade along at least one of said jaw portions, for mechanically cutting tissue  
3 as the jaw portions are pivoted toward contact with each other.

1 10. An electrosurgical, tissue sealing medical device as in claim 1, further  
2 comprising:  
3 said jaws including means for substantially uniformly compressing tissue being  
4 manipulated by the jaw portions.

1 11. An electrosurgical, tissue sealing medical device, comprising in  
2 combination:  
3 co-operating device jaws including jaw portions for manipulating tissue;  
4 solution infusion openings defined along the jaw portions, the solution infusion  
5 openings being constructed and arranged for receiving an electrically conductive  
6 solution and infusing the solution through the openings and along the jaw portions  
7 into tissue manipulated by the jaw portions; and  
8 an electrical conductor operatively associated with the device jaws for  
9 conducting electrical energy to the electrically conductive solution in contact with the

1 manipulated tissue, the solution being supplied in quantity and the electrical energy  
2 being supplied in power such that energy density in the tissue in contact with the  
3 solution is in a range that seals the tissue against substantial flow of air;  
4 whereby tissue may be manipulated without desiccation of the tissue and with  
5 sealing of the tissue against substantial air flow from the tissue.

1 12. An electrosurgical, tissue sealing medical device apparatus comprising  
2 in combination an electrosurgical, tissue sealing medical device having co-operating  
3 device jaws including jaw portions for manipulating tissue, solution infusion openings  
4 defined along the jaw portions, the solution infusion openings being constructed and  
5 arranged for receiving an electrically conductive solution and infusing the solution  
6 through the openings and along the jaw portions into tissue manipulated by the jaw  
7 portions, and an electrical conductor operatively associated with the device jaws for  
8 conducting electrical energy to the electrically conductive solution in contact with the  
9 manipulated tissue;  
10 the apparatus further comprising a solution supply constructed and arranged  
11 to supply solution to the solution infusion openings; and

1 an electrical supply to the solution of electrical energy;  
2 the solution being supplied in quantity and the electrical energy being supplied  
3 in power such that energy density in the tissue in contact with the solution is in a  
4 range that seals the tissue against substantial flow of fluid.

1 13. An electrosurgical, tissue sealing medical device, comprising in  
2 combination:  
3 co-operating device jaws including jaw portions for manipulating tissue, a  
4 plurality of longitudinal grooves along said jaw portions;  
5 a pivot for pivoting movement of said jaws into contact with each other and  
6 away from contact with each other;  
7 a plurality of solution infusion openings defined and spaced along each of the  
8 jaw portions for manipulating tissue, said solution infusion openings located in said  
9 plurality of longitudinal grooves, for receiving solution and infusing solution into the  
10 tissue along said jaw portions;  
11 a solution supply to said plurality of solution infusion openings, for supplying  
12 solution at a rate in a range of .01 to 100 cc/min;  
13 an electrical supply of electrical energy sufficient to affect tissue, to said

1 solution supply; and  
2 an extended shaft connected to said jaws for endoscopic use of said device.

1 14. A medical procedure of manipulating tissue, comprising:  
2 infusing an electrolytic solution to tissue;  
3 supplying electrical energy to said solution and thereby said tissue; and  
4 supplying the solution in quantity and the electrical energy in power sufficient  
5 to seal the tissue against fluid flow from the tissue.

1 15. A medical procedure as in claim 14, wherein the electrolytic solution  
2 is saline.

1 16. A medical procedure as in claim 14, wherein the solution is supplied  
2 in quantity and the electrical energy in power sufficient to seal the tissue against air  
3 flow from the tissue.

1 17. A medical procedure as in claim 14, wherein the solution is supplied  
2 at a rate in the range of .01 to 100 cc/min;

1           18.    A medical procedure as in claim 14 wherein the electrical energy is  
2           supplied at a power in the range of 1 to 200 watts.

1           19.    A medical procedure of manipulating thin, delicate tissue, such as  
2           connective tissue, using an enhanced solution-assisted electrosurgical medical device,  
3           an electrolytic solution source, and an electrical energy source, said device comprising  
4           in combination co-operating device jaws including jaw portions for manipulating  
5           tissue, and a plurality of solution infusion openings defined and spaced along each of  
6           the jaw portions for manipulating tissue, for receiving solution and infusing solution  
7           into the tissue along said jaw portions, the medical procedure comprising:

8                   supplying electrolytic solution from the solution source to the solution infusion  
9                   openings of said jaw portions, thereby infusing solution into tissue along the jaw  
10                  portions;

11                  supplying electrical energy from the electrical energy source sufficient to affect  
12                  tissue to said solution; and

13                  manipulating tissue with said jaw portions at least in part while solution is  
14                  infused into tissue along said jaw portions and electrical energy is supplied to said  
15                  solution;

1                   whereby the manipulated tissue is sealed against fluid flow from the tissue  
2                   during manipulation.

1                   20.     A medical procedure of manipulating tissue as in claim 19, further  
2                   comprising supplying electrical energy sufficient to affect tissue to said jaw portions.

1                   21.     A medical procedure of manipulating tissue as in claim 19, further  
2                   comprising utilizing a device having jaws with jaw portions having a longitudinal  
3                   dimension in a range of 0 to 6 inches, and further comprising:  
4                   supplying solution to said solution infusion openings at a rate in a range of  
5                   .01 to 100 cc/min.

1                   22.     A method of treating masses in the lungs, comprising:  
2                   isolating the masses from surrounding healthy lung tissue by sealing lung tissue  
3                   encircling each mass.

1                   23.     A method of treating masses in the lungs, as in claim 22, in which the  
2                   sealed lung tissue is sealed into omnistasis.

1           24.    A method of treating masses in the lungs, as in claim 22, further  
2           comprising:

3           resecting the masses to remove the masses from the lung tissue.

1           25.    A method as in claim 22, the sealing of lung tissue being conducted  
2           through application of electrolytic solution energized by electrical energy.

1           26.    A method as in claim 22, or claim 25, the sealing of lung tissue being  
2           conducted through application of compression to the tissue.

1           27.    A method of treating masses in the body, comprising:  
2           at least partially isolating the masses from surrounding healthy tissue by  
3           sealing tissue at least partially encircling each mass.

1           28.    A method of treating masses in the body, as in claim 27, in which the  
2           sealed tissue is sealed into omnistasis.

1                   29.    A method of treating masses in the body, as in claim 27, further  
2                   comprising:  
3                   resecting the masses to remove the masses from the body.

1                   30.    A method as in claim 27, the sealing of tissue being conducted through  
2                   application of electrolytic solution energized by electrical energy.

1                   31.    A method as in claim 27, or claim 30, the sealing of tissue being  
2                   conducted through application of compression to the tissue.